

**ADSORPTIVE SEPARATION OF CHLORONITROBENZENES:  
STATIC EQUILIBRIUM STUDY**



**Akekasit Leardsakulthong**

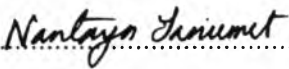
A Thesis Submitted in Partial Fulfilment of the Requirements  
for the Degree of Master of Science  
The Petroleum and Petrochemical College, Chulalongkorn University  
in Academic Partnership with  
The University of Michigan. The University of Oklahoma.  
Case Western Reserve University and Institute Français du Pétrole  
2008

**512007**

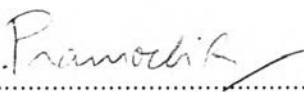
**Thesis Title:** Adsorptive Separation of Chloronitrobenzenes: Static  
Equilibrium Study  
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**Program:** Petrochemical Technology  
**Thesis Advisors:** Assoc. Prof. Pramoch Rangsunvigit  
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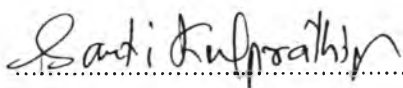
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Accepted by the Petroleum and Petrochemical College, Chulalongkorn  
University, in partial fulfilment of the requirements for the Degree of Master of  
Science.

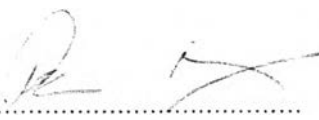
  
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## บทคัดย่อ

เอกสิทธิ์ เลิศสกุลทอง: การศึกษาการแยกคลอโรไนโตรเบนซีนไอโซเมอร์ด้วยกระบวนการดูดซับ ณ สภาวะสมดุลสถิต (Adsorptive Separation of Chloronitrobenzenes: Static Equilibrium Study) อ. ที่ปรึกษา : รศ. ดร. ปราโมช รังสรรค์วิจิตร และ ดร. สันติ กุลประทีป  
ปัญหา 69 หน้า

คลอโรไนโตรเบนซีนใช้ในอุตสาหกรรมหลายชนิด อาทิ อุตสาหกรรมยาฆ่าแมลงและวัชพืช เครื่องสำอางค์ เคมี และยาง ในการแยกแต่ละไอโซเมอร์ของคลอโรไนโตรเบนซีนออกจากรันต้องใช้กระบวนการที่ซับซ้อนและมีค่าใช้จ่ายสูง ในงานวิจัยนี้ศึกษาการแยกไอโซเมอร์ของคลอโรไนโตรเบนซีนโดยใช้กระบวนการดูดซับในวัฏภาคของเหลวซึ่งใช้ซีโอไลต์เอ็กซ์ และวายเป็นสารดูดซับ นอกจากนี้ยังทำการศึกษาผลของการแลกเปลี่ยนไอออนในโครงสร้างของซีโอไลต์เอ็กซ์และวายที่มีผลต่อค่าความสามารถในการดูดซับ ค่าการเลือกดูดซับ ค่าความสามารถในการดูดซับอิมตัวของเมทา- และพารา- คลอโรไนโตรเบนซีนในระบบสารเดี่ยวและระบบสารผสมบนสารดูดซับ จากผลการทดลองพบว่าค่าการเลือกดูดซับสูงสุดระหว่าง เมทา- และพารา- คลอโรไนโตรเบนซีนที่ความเข้มข้นสูง ณ สภาวะสมดุล คือ 2.08 บนซีโอไลต์วายที่มีโซเดียมเป็นไอออนแลกเปลี่ยนในโครงสร้าง กราฟแสดงการดูดซับ ณ สภาวะสมดุลของระบบสารผสมระหว่างไอโซเมอร์สองตัวนี้ได้นำมาแสดงด้วย นอกจากนี้ยังรายงานผลของสารที่ใช้ในการชะเมทา- และพารา- คลอโรไนโตรเบนซีนที่ถูกดูดซับออกจากสารดูดซับ และผลของปริมาณน้ำในโครงสร้างของซีโอไลต์ที่มีผลต่อการแยกไอโซเมอร์ทั้งสองอีกด้วย

## ABSTRACT

4971002063: Petrochemical Technology Program

Akekasit Leardsakulthong: Adsorptive Separation of  
Chloronitrobenzenes: Static Equilibrium Study

Thesis Advisors: Assoc. Prof. Pramoch Rangsunvigit, Dr. Santi  
Kulprathipanja 69 pp.

Keywords: Adsorption/ Chloronitrobenzene/ Zeolite/Separation

Chloronitrobenzenes (CNBs) are used in numerous industries including pesticide, fungicide, pharmaceutical, preservative, photochemical and rubber industries. The methods used to separate each isomer are complicated and costly. In this study, an adsorptive process was investigated for potential CNB isomer separation. The liquid phase adsorption of CNBs was studied on a series of X and Y zeolites. The effect of cation exchange on the selectivity and adsorption capacity was also investigated. *m*-CNB and *p*-CNB were used as a feed component. The saturation capacities of single and binary systems of the adsorbates on the adsorbent were determined. The highest selectivity determined for *m*-/*p*-CNB is 2.08 for NaY at high equilibrium concentration. The competitive adsorption isotherms of the two isomers were also observed. Moreover, a series of desorbents and water content in the zeolite structure were chosen in order to study their effects on the separation.

## ACKNOWLEDGEMENTS

This thesis could not be completed without the assistance of many people and support of my advisor, college and my family.

First, I would like to express my gratitude to Dr. Santi Kulprathipanja, my US advisor, for giving me the best opportunity of spending two weeks in the US. Although I had a great chance to stay there only short time, but I received a great valuable thing in my life. He taught me not only the way to do the thesis and gave me many suggestions but also the way to be a good person. I am also indebted to his wife, Ms. Apinya Kulprathipanja, for her invaluable kindness. She made me like staying at my home.

I also appreciate Assoc. Prof. Pramoch Rangsunvigit, my Thai advisor. He provided superb guidance, encouragement, and creative suggestion. My thanks are also for his kindness, for being patient in listening to my opinion and in proofing my writing.

I am grateful for the partial scholarship and partial funding of the thesis work provided by the National Center of Excellence for Petroleum, Petrochemicals, and Advanced Materials, Chulalongkorn University.

Special thanks are extended to UOP LLC for providing me a budget for observing research in the US. Also, I would like to thank the people who did favors for me during my work there, particularly for Mr. Darryl M. Johnson and Mr. Jim Priegnitz who helped me when I was there.

Finally, I would like to thank all of my friends and PhD students for their friendly cheerful and useful assistance. Also, I would like to take this opportunity to thank my parents for their encouragement, understanding, and love.

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